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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/536,721	03/28/2000	Toshiaki Hongoh	PM 266959	5386

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EXAMINER

CROWELL, ANNA M

ART UNIT	PAPER NUMBER
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1763

12

DATE MAILED: 11/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/536,721

Applicant(s)

HONGO, TOSHIKI

Examiner

Michelle Crowell

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 10-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 18-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2 and 3 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites, "the slot electrode to be in a predetermined temperature range so as to substantially eliminate influence of water released from components in the process chamber on a substrate". This portion of the claim is unclear and confusing to the examiner. How does the temperature of the slot electrode affect the water released from components and a substrate?

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1,2, and 4-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishii et al. (U.S. 5,698,036).

Referring to Figures 14-19, column 11, line 46- column 12, line 67, and column 14, line

Art Unit: 1763

60 – column 15, line 13, Ishii discloses a microwave plasma processing apparatus comprising a microwave introducing port 81 which introduces microwaves into the processing container 4 (processing chamber), dielectric material 80 for shortening the guide wavelength of the microwave (wavelength reducing member), a flat antenna member 44 (slot electrode) to form an electrostatic field in the processing space S, a dielectric-material accommodation portion 82a (antenna accommodating member) of the antenna covering member 82 which covers the dielectric material 80, and a ceramic protective plate 92 (dielectric material member) formed on the lower surface of the antenna member 44 that protects the antenna member 44 from plasma.

On the upper surface of the antenna covering member 82, cooling fins 84 (first temperature control device), cooling fans, or cooling jacket may be used to cool the flat antenna member 44, dielectric material 80, and dielectric accommodating portion 82a. Also, a cooling jacket 18 (second temperature control device) in support frame 8 cools the processing wafer.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. 5,698,036).

Regarding the temperature of the temperature control device, it would have been obvious to one of ordinary skill in the art at the time of the invention to maintain the temperature of the slot electrode in a predetermined range of 60-80°C. This would prevent the slot electrode from

Art Unit: 1763

physical deterioration and yield optimum processing conditions. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. 5,698,036) in view of Yamazaki (Japanese Patent Publication 10-060657).

Ishii fails to teach a temperature control device for the periphery of a dielectric material member.

Referring to solution, Yamazaki teaches a microwave plasma processing apparatus which supplies a cooling gas (third temperature control device) between top plate 31 and dielectric substance window 30 (dielectric material member). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the dielectric material member of Ishii with the temperature control device as taught by Yamazaki. This would prevent a thermal destruction of the dielectric material member.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. 5,698,036) as applied to claims 1, 2, and 4-7 above, and further in view of Yamazaki (Japanese Patent Publication 01-036985).

Ishii fails to show the temperature control arrangement for controlling the temperature of the side wall.

Referring to the abstract and constitution, Yamazaki show a microwave plasma CVD apparatus which uses a heater 110 and a cooling pipe 111 (temperature control device) to control the temperature of the side wall. It would have been obvious to one of ordinary skill in the art at

Art Unit: 1763

the time of the invention to provide the side wall of Ishii with the temperature control device as taught by Yamazaki. This would prevent the deterioration of the film quality due to the discharge of an impure gas from the inner wall.

9. Claims 18-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. 5,698,036) in view of Fujimoto et al. (Japanese Patent Publication 01-072526).

Ishii fails to specifically teach a control unit, temperature sensor, and a heater.

Referring to the abstract and Drawings 1 and 2, Fujimoto teaches a microwave plasma processor with an electrode 8 (slot electrode) connected to temperature control means (control unit). The temperature control means includes a heater 12 (heating wire), heater power source 9, and a thermometer 13 (thermocouple). The heater power source controls a current, which is made to flow through the heater 12 (heating wire) based on the detected temperature. It is important to control the temperature of the electrode in order to prevent instability in the plasma. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the slot electrode and wavelength reducing member of Ishii with control unit, temperature sensor and heater as taught by Fujimoto. By controlling the temperature of the slot electrode and wavelength reducing member, instability of the plasma is prevented.

10. Claims 21 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. 5,698,036) in view of Fujimoto et al. (Japanese Patent Publication 01-072526). as applied to claims 1, 2, 4-7, 18-20, and 22 above, and further in view of Orezyk et al. (U.S. 5,937,323) and Shirasago et al. (Japanese Patent Publication 02-197575).

Ishii in view of Fujimoto fails to teach a temperature control plate and fluid controller.

Art Unit: 1763

Referring to Figure 1a and column 4, lines 66 – column 5, line 8, Orezyk teaches a temperature control plate including a cold plate 24 and a heater plate 23 (heating wire). The cold plate 24 and heater plate 23 are provided on the dome 14 (dielectric) and the top coil 29 (electrode). Providing the temperature control plate to the dome reduces the flake or particle counts in the chamber. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the slot electrode and wavelength reducing member of Ishii with the temperature control plate as taught by Orezyk. This would reduce the amount of particle flaking from the chamber's components.

Referring to the abstract, Shirasago teaches an electrode 110 provided with a pipe 1102 for flowing a fluid. The temperature of the fluid is measured using a thermocouple 1101 and controlled by a temperature controller 1103. Furthermore, a feeder 1104 (mass flow controller and stop valve) regulates the feed rate of the fluid inside the pipe. It is important to control the temperature of the electrode 110 in order to control the potential of the plasma. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the temperature control plate of Ishii in view of Fujimoto and Orezyk with a fluid controller as taught by Shirasago. By controlling the temperature of the electrode, the potential of the plasma is controlled.

Response to Arguments

11. Applicant's arguments filed August 16, 2002 have been fully considered but they are not persuasive.

Regarding Claim 1

Art Unit: 1763

Applicant has argued that the cooling jacket does not control the temperature of the slot electrode and component parts including the wavelength reducing member in a predetermined range of temperatures. The cooling jacket of Ishii et al. does control the temperature of the flat antenna member 44 (slot electrode) and the dielectric material 80 (wavelength reducing member) in a predetermined range of temperature. The flat antenna member 44 and dielectric material 80 must be maintained at a certain temperature range in order to prevent melting and deterioration.

Regarding Claim 3

Applicant has argued that Ishii et al. does not recite the temperature range (60°C and 80°C). The examiner admits that Ishii et al. does not recite the temperature range, however where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges (60°C and 80°C) by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Regarding Claim 8

Applicant has argued that the cooling gas of Yamazaki is not a device. The third temperature control device is the nozzle that supplies the cooling gas to the periphery of the dielectric substance window.

Regarding Claim 9

Applicant has argued that Ishii et al. fails to show the temperature control arrangement for controlling the temperature of the side wall. The heater 110 and cooling pipe 111 (temperature control arrangement) for controlling the temperature of the side wall is found in Ishii et al. in view of Yamazaki.

Art Unit: 1763

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Application/Control Number: 09/536,721

Page 9

Art Unit: 1763

AMC *AMC*
November 7, 2002


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
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